LABORATORY

WORKING WITH THE MICROSCOPE

Objective

To use the compound microscope as an investigative tool.

Materials

compound microscope
lens paper
newsprint with lower-case "e"
scissors
glass slides
onion
paper towel
medicine dropper
cover slips
clear plastic ruler
forceps
scalpel
iodine
fiber sample

Procedure

Part I: Position of Objects under the Microscope

1 Use the lens paper to clean all the lenses of the microscope thoroughly.

2 Locate and cut out a lower-case "e" from the newsprint.

3 Prepare a temporary wet mount, as shown in *Nelson Biology*, page 25.

4 Place the slide on the microscope stage with the "e" facing you in an upright position. Locate the "e" under low-power magnification. Make sure the letter is centered in the field of view.

5 Use the coarse adjustment to bring the image into focus. Sharpen the focus with the fine adjustment knob.

a) Describe the orientation of the "e" as seen through the microscope.

6 Slowly move the slide away from you while viewing the "e."

b) In what direction does the letter appear to move?

7 Move the slide to the left while viewing the "e."

c) In what direction does the letter appear to move?

8 Rotate the revolving nosepiece to medium-power magnification. Use the fine adjustment to bring the letter into focus.

d) Does the width of the letter change? How?

9 Adjust the letter so that it is directly in the center of the field of view. Rotate the nosepiece to high-power magnification. Use the fine adjustment to obtain a clear image.

e) Do you see more or less of the letter?

f) Under which magnification is the image brought closer to the eye?

g) Which magnification would be most suited for scanning several objects ?

h) Which magnification provides the widest angle for viewing?

Part II: Determining Field Diameter

10 Return the nosepiece to low-power magnification. Place a clear plastic ruler on the microscope stage and focus on the millimeter divisions along the edge of the ruler.

i) Measure and record the diameter of the field of view by counting the number of millimeter divisions. Estimate to the nearest 0.5 mm.

j) Convert millimeters to micrometers (μm). (1 mm = 1000 μm.)

11 Rotate the nosepiece to medium-power magnification. Use the fine adjustment and locate the millimeter divisions.

k) Record the diameter (in micrometers) of the field of view.

CAUTION: Do not use the high-power objective for this procedure.

12 The field of view for high-power magnification can be determined indirectly by calculating the ratio quotient of the high-power objective lens to the low-power objective lens. Calculate the ratio quotient.

l) $$\text{Ratio quotient} = \frac{\text{magnification of high-power lens}}{\text{magnification of low-power lens}}$$

13 Calculate the diameter of the field of view for the high-power objective (use micrometers).

m) $$\text{High-power field diameter} = \frac{\text{low-power field diameter}}{\text{ratio quotient}}$$

Part III: Measuring Microscopic Structures

14 Prepare a temporary wet mount of onion tissue stained with iodine. (See *Nelson Biology*, page 140.)

15 Select a well-stained cell. Estimate in micrometers the length and width of the cell. You may use any level of magnification that is satisfactory. However, remember that each magnification has its own field of view.